Before the Federal Communications Commission

Washington, DC 20554

In the Matter of) CS Docket No. 98-201
) RM No. 9335
) RM No. 9345

Comments of the

Electronics Technicians Association, International, Inc.
Richard L Glass, CETsr
President
602 N. Jackson
Greencastle, In 46135

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1. Introduction:

ETA, International is a not-for-profit professional association, incorporated in the state of Indiana in 1978. ETA-I represents over two thousand members. Many of these members are technicians who provide electronics installation, maintenance and repair of virtually all types of communications equipment, including cable TV, SMATV, computers, fiber optics, consumer electronics products, industrial and telecommunication products. Many of those involved in cable, SMATV, and consumer electronics also install satellite dish systems and rooftop antennas.

A subdivision of ETA is the Satellite Dealers Association (SDA). SDA members are typically local satellite and antenna installers and/or small business owners.

ETA-I has conducted a worldwide certification program, in cooperation with nearly five hundred tech schools since 1978 (and through a predecessor association since 1966). The program tests and certifies technicians who demonstrate a minimum level of knowledge,

experience, and skills in core and specialty areas of the electronics industry. Three of the total of fifteen categories of certifications are closely related to the subject of CS Docket 98-201. They are: Certified Satellite Installer, Registered Small Dish Installer, and RF Video Distribution Technician.

For many years, ETA-I has conducted educational seminars to help entry-level and practicing satellite, antenna, distribution systems and consumer electronics technicians gain knowledge about installation, servicing, and the rules and regulations utilized in the signal distribution area of electronics. In addition, the association has brought together multiple authors to write and publish study guides, several of which pertain to rooftop antennas, satellites, and distribution systems.

Finally, ETA-I is a COLEM (since privatization in 1993) for the FCC, administering FCC commercial license examinations. An auxiliary volunteer project associated with COLEM duties has been active participation in Commercial Radiotelephone Examination Development tasks groups including GROL, GMDSS, and the Radar Endorsement.

2. Relevant Experience related to CS Docket No. 98-201:

An effort has been made to understand the methodology required in making a signal level reading which could qualify as complying with the Satellite Home Viewer Act of 1988. ETA has analyzed the suggested signal level minimums for the three television bands; the information provided by a major maker of signal measurement equipment; the information provided by two affiliated network local (Indianapolis and Terre Haute, IN) TV stations; and information submitted by the DISH Network. First, we tried to utilize the test equipment of a closely allied retail sales/service firm which has more than fifteen years experience in owning/operating two franchise cable TV systems, one master antenna apartment distribution system; selling and servicing C-band, DISH, DSS, and Primestar satellite systems, plus being heavily involved in the rooftop antenna business in a B-Contour area. The test

equipment includes four models of Sadelco signal level meters. We also utilized an AUGAT LRC RF Leakage Detection meter. This equipment totals a value of over $5,000, if new.

We then contracted several network affiliates to discuss the inability of practicing TV-antenna-SMATV-Satellite technicians to make the field measurements and correlate them with the dBu readings required. Some of these TV stations were to have their station chief engineers get with us to clarify the procedure. In each and every case, the results were the same: they had no practical, usable method which practicing antenna technicians could use.

We then sought the help of an expert in the field from a well respected engineering university. That too, resulted in no conclusion - further study needed. We did receive an excellent listing of dozens of electromagnetic wave propagation/antenna formulas from a renowned author with over 30 years of experience in engineering and engineering management. None of the formulas were useful in providing a practical method of serving the public by making a field check of network broadcast signal levels.

We went further and consulted several US Military Training Manuals pertaining to "field strength", "field intensity", "wave propagation" ,"per meter" definitions and related topics. None of these were helpful in this project.

Lastly, we were able to discuss the problem with two information people from two different FCC offices. The most important finding here was that everyone involved in this SHVA measurement discussion is not speaking the same technical language. "Per meter" means at least three different things, for instance. (See "The Need" pg 5)

The above is presented to build the case that measuring television signal strength is a function that needs to be brought out of the stone age and dealt with in a simple, practical manner. Once that obstacle is overcome, a set minimum microvolt level reading can be established. That reading should be the same for any TV channel since TV specifications don't differentiate between bands. The argument that taking a reading at a height of thirty feet is impractical is debatable. Twenty feet is more practical so far as being easily

accomplished by one technician, but technicians know how to take a reading from an antenna raised to a thirty foot height, thus it is, at least possible to do.

3. The Need

The standard antenna can not be a one meter, half-wave dipole since the term is explained as a "one meter long piece of metal" or a "one meter long wire" or a " one meter antenna" (we might guess it means a one meter, half-wave dipole)! According to people who are knowledgeable in the television antenna business, the standard antenna should be a half - wave dipole of the size resonant for the broadcast frequency in question. With more than one network affiliate per area, it quickly becomes evident that more than one correct length dipole may be required. That is why the most common television antennas are log periodic style, or multiple element "all-band" types. Gain factors in dB's for any TV all-band antenna can easily be verified. That reasonable sized test antenna can be used by the antenna installer to verify reception levels.

4. Signal Levels versus Signal Quality

The Commission rightly notes that Congress did not address signal quality. Longley-Rice or other metro-area mapping plans attempt to address the quality issue by recognizing potential multiple images, blind spots or co and adjacent channel locations, but it is a subjective topic. An "acceptable" television picture can be an arbitrary decision. The best answer may be to provide a step-by-step process for granting a waver when signal strength is above the minimum but video or sound quality is unacceptable. The procedure:

Step 1. Customer claims picture is inferior

Step 2. A professional performs signal level check if necessary and fills out a "degraded picture" form explaining the unacceptable item(s): severe ghosting, power line

interference causing frequent loss of sync, color shifting due to multiple images, unacceptable audio, etc.

Step 3. TV broadcaster has timely opportunity to use independent agent to verify claim

Step 4. Homeowner granted or denied written waiver by broadcaster

5. Missing Ingredients in Rules:

In all of the discussion of minimum signal levels, we have seen emphasis placed on antenna correction factors which relate to a meter-length antenna; antenna height during the measurement and a five minute signal fluctuation recording. We have not seen the suggestion that an antenna rotator may be required when broadcaster antenna farms are at more than one direction. A rotator is as important as other factors in many areas of the country. Very important is the use of pre-amplifiers. Most homes in B-Contour areas require a pre-amplifier. Without a pre-amplifier, most often mast-mounted, at least 50% of all homes in a B-Contour would qualify for network signals. In our county (Putnam, Indiana) virtually all rooftop antenna systems include a pre-amplifier. A majority also include a rotor even though at one direction homeowners can receive NBC, CBS, ABC, PBS, and FOX, from Indianapolis.

Specific Responses to NPRM

A. The Satellite Home Viewers Act

Section 2

The definition (A) should be worded "cannot receive, through use of a conventional outdoor rooftop antenna SYSTEM,..."

It is not likely that Congress meant a simple, non-amplified antenna. If so, virtually all of Putnam County, Indiana (45 miles from Broadcast transmitters) would be eligible for network signals via satellite.

B. Grade B Contours and Signal Intensity

Section 4

Defining Grade A and B contours for broadcast purposes may have served the purpose of setting guidelines for transmission power and area coverage. However, it has never been of use to the general public, or the television technicians and antenna installer/servicers. The thirty foot height is workable, but an unnecessary burden.

Suggestion: Reduce the signal measurement height to a level that is not unwieldy for one technician - between twenty and twenty-five feet (an antenna on two telescoping ten-foot masts on a tripod, or hand-held).

Change the requirements for Grade B signal reception to mandate that 100% (not 50%) of the homes should get an acceptable picture at least 90% of the time.

Section 5

Rather than Channels 2 through 6 being required to have "less than 47 dBu", change the level to a microvolt reading like 26.884 or 27 microvolts. 27 Microvolts is -31.5 dBmV - a reading all satellite and antenna technicians recognize and can quickly measure. If that reading is recorded, using a five-foot ten-inch half-wave dipole antenna, the signal is at the minimum Grade B level, for Channel 6 any reading below that qualifies for network signals. Everyone can easily make these measurements with the meters commonly used by the antenna industry.

C. The Prime Time 24 Lawsuits

Section 6

The only method currently in use by antenna technicians for ascertaining below-minimum television signal levels is by utilizing postal zip codes, verifying that the home is outside Grade A and B contours. Those antenna technicians using signal level meters to verify below-minimums are (in the main) unable to do so. If they obtain a level below the capabilities of common field strength meters, which is -40 dBmV, they can claim "no signal" and sign the release form. Between "no signal" levels and the listed dBu amount, no one knows what they are doing. This, because the measurement technique is foreign to what technicians have been trained to do since television sets were first marketed.

Section 7

Many of those .7 to 2.2 million network satellite subscribers are in excellent Class A and Class B contours. They find it less expensive "in the short run" to get network programming via satellite rather than having a proper antenna installed. Where one satellite dealer won't sell

Primetime 24 network, or Netlink Denver 5 programming packages to customers, they go to another dealer who will.

Section 8

Very simply, an easy to accomplish signal level check, with realistic microvolt minimums would help with the Raleigh, NC determination. Using a seventy-five mile radius determination is not fair to viewers - just a decision that is easy to make.

D. The NRTC and EchoStar Petitions

Section 9

The NRTC and EchoStar petitions rightly ask that the definition of "unserved" households be redefined. Suggesting that 100% of the households should be able to receive over-the-air coverage 100% of the time is impossible. However, the notion that the household should 'expect' to receive acceptable signals except during unusual atmospheric occurrences, locally generated interference or during station outages, is not unrealistic. It is correct. The EchoStar suggestion of 99% is better wording.

The most important part of this paragraph is the use of the words "affordable receiving equipment" Equipment should, in many cases include:

1. Antenna
2. Coaxial cable
3. Pre-amplifier
4. Mast
5. Possibly a rotor

The SHVA uses the term "antenna". "Antenna system" is correct wording except when a set-top "rabbit-ear" antenna is used.

Section 10

Members of this organization most often are providers of both antenna service for local channels and satellite reception equipment. The unwillingness of the major 'players' in the television antenna industry to provide [those workers who must perform the signal measurement tasks] practical help for the benefit of everyone, is important to note. It is also the reason the FCC must re-establish practical standards and methods.

Section 11

Congress may well have had in mind the protection of local affiliates by allowing only "unserved" homes to subscribe to the networks. There is a large "gray area" (not a white area) that may not have been considered by Congress. It is that in-between areas (between no-signal and acceptable signal) that is not properly defined. That is what this rule making should seek to do.

Section 12

Not only did Congress not 'freeze' the Grade B definition, but it was attempting to legislate in new high-technology areas that should always be subject to review as technology changes. An example: Most HDTV broadcasts are slated for UHF spectrum. We will not know the extent of the "acceptable" signal level requirements until HDTV has a chance to be used by the public and until satellite/antenna professionals have had time to test and experiment with it. Shying away from reshaping the standards and methods doesn't serve the public well.

Section 13

We agree that the commission should move expeditiously to resolve the Grade B definition problem and related matters and to provide the practical signal measurements and signal

quality testing procedures that clearly show which viewers are eligible to subscribe to networks via satellite, and which clearly are not eligible (and thus should install a proper roof-top, attic, soffitt mount or other local reception antenna).

Section 14

Agreed. Robust competition, like apple pie and motherhood, is wonderful. The problem here isn't competition - it is defining the rules for competing. Robust competition, while a catchy phrase, may not be in everyone's best interest, if it is predatory competition. For instance, all of the satellite receiving equipment is now made in foreign countries! Four out of five of those satellite dealers in business in 1990 are no longer part of America's small business community due to unconscionable business practices. Given a level playing field, competition is at its best for broadcasters, the satellite industry, antenna providers and the dealers and technicians who ultimately make everything work.

II. Analysis and Request for Comments

Section 15

Pertinent to this SHVA is the problem some viewers have in both A and B contour areas who may wish to utilize a rooftop antenna system, but are prevented from doing so due to home owner association covenants, that while pre-empted by the commission, nevertheless continue to prevent first amendment right to information. This problem, traditionally cheered on and sometimes instigated by cable interests, puts many viewers in "unserved" households. Simple enforcement of the law can reduce or eliminate this problem.

Section 16

The crux of the problem... Those defining "unserved households" may have needed additional help in setting the rules and defining the contour signal levels. The rules may have assisted broadcasters in predicting co or adjacent channel interference, but they are useless for SHVA purposes.

Section 17

The commission, by previously not establishing practical, clear measurement methods and levels (in a dispute between satellite and broadcast interests), has allowed this overall problem to fester and end up in legal action. Who else but the commission can gather the expertise, experience, and suggestions to develop the easy-to-use testing method, practical levels, and video quality parameters?

A. Commission's Authority to Proceed

Section 18

Congress did not intend to prevent under-served and unserved households from accessing network signals. Members of Congress could not be expected to become both broadcast and reception experts. While it may be convenient for the broadcast industry to attempt to prevent a fair and logical solution to this problem, that "Dog in the Manger" attitude can only result in congressional pressure to pass a new SHVA which, with the present push for open competition, could cause congressional reaction that is not as network friendly as the 1988 act.

Sections 19, 20, and 21

We agree.

Section 22

The Commission need not revise the Grade B rules for certain broadcast measurement purposes. It surely must provide a separate rule for measuring TV signals by practicing antenna and satellite professionals. If the new measurement rules and standard levels happen to coincide with "acceptable" pictures and sound from signals meeting the current unclear rules, so be it. If not, the new measurement criteria must favor "acceptable" picture quality which includes not only minimum field strength levels, but interference, ghosting, or other deterioration elements.

Section 23

The broadcasters point out that predictive models do not address cases where individual homes have specific factors affecting the reception ability. "One size doesn't always fit all." Again, developing an objective practical measurement procedure is a better answer. This doesn't preclude a predictive model that can aid the public and others in eliminating arguments in clearly unserved areas, or clearly acceptable signal areas. The model must have allowance for an appeal by acquiring a real signal strength measurement in all of the 'gray' or 'in-between' areas.

Sections 24 and 25

Agree as stated in the preceding comment

B. Definition, Prediction, and Measurement Proposals

Section 26

The commission's current rules may fit the broadcast industry. However, they are of no value in their present form to practicing antenna and satellite technicians. Refinement may

be the term for re-developing the rules but the #26 paragraph itself only lists [antennas, transmissions lines and receivers] rather than "antenna systems". The difference in reception ability between a bare antenna - of any style, length, etc. is vastly different from a system as commonly used in suburban and rural areas.

B1. Defining a Signal of Grade B Intensity

Section 27

Virtually all of our comments in the above center on the flawed definition presented in 73.683. Intended to be an objective standard, it is first: not useable by practicing antenna/satellite technicians, and second: arbitrary. This is evident as it uses the term "acceptable to the median observer" and assuming the receiving installation uses an "antenna, transmission line, and receiver considered to be typical of outlying or near fringe areas." The definition should aim at providing a TV set with at least a minimum RF voltage level of signal. TV's are specified for 1000 microvolts of input RF signal. A -12 dBmV signal (257 microvolts) is watchable, but snowy. A -6 dBmV signal (501uV) is "acceptable" to far more than the median observer.

The undiscussed use of pre-amplifiers and rotors should be input here. If one lives in an area far removed from a transmit station tower, he should not expect to receive the same strong television signal as an urban dweller. It's the same with travel costs in getting to work from the rural home. It takes more fuel, and more time to accomplish the same end - getting to work downtown.

People in rural areas have to try harder to get the same television signal levels as their city counterparts. To do that may require a higher gain antenna. (Common all-band antennas easily achieve four times or 12 dB gain over half-wavelength simple dipoles, cut for each channel.) In addition to a good antenna, most often a pre-amplifier is required. Typically,

gains are 17-24 dB. In rural areas where broadcasters may be located in different directions and/or different cities, a rotor is desirable. Some people are content to view stations from only 1 of the available directions. Most rural households opt for a rotor in order to achieve maximum reception capabilities. Often, these rural locations are able to receive many more local television broadcasts than any of the city dwellers. They don't expect to be able to achieve their results with a set-top antenna. More often the rooftop antenna requires an investment of $250 - $500. Those far fringe area dwellers may opt for a tower also, which can add $500 - $1000. depending on the size. To lump all television viewers into one package - or arbitrarily rule out an antenna system that is the actual requirement for some Grade B homes, simply because it cost more than someone's perception of what a rooftop antenna "should" cost, is very wrong thinking. To grant a SHVA waiver to a Grade A or B home simply because they won't invest more than the price of a $9.95 rabbit ear antenna is wrong so far as Congress' intent in the SHVA.

Section 28

The problem here is that Grade A intensity levels should be established to provide a minimum level of signal (in microvolts). Whether that level is agreed to as 1000 microvolts (0 dBmV) or a lesser value, is a decision which can be arrived at through consensus. The establishment of a figure, and its exact value, is the difficult part even though the result makes the entire issue simple.

The Grade B intensity is lesser. Grade B households aren't expected to receive crystal clear pictures from "whole house wiring" or rabbit ear antennas. Although much more subject to fog, rain, power line and other interference, Grade B signals are reliable. With a proper antenna system, B contour households can receive crystal clear pictures (without ghosting) on multiple channels. Putnam County, Indiana, B Contour households receive eighteen excellent quality channels in stormy, cloudy, snowy, and clear weather. Grade B signal level

minimums which work for the broadcast community appear to have worked for these households over the years. Establishing a different criteria for reception quality for individual households is likely the best solution to the problem.

B2. Predicting a Signal of Grade B Intensity

Section29

Prediction of whether a household receives a Grade B intensity signal is a little like predicting the weather. It is fairly accurate. For SHVA absolute accuracy, a means of actual signal level verification is required. Establishing the microvolt levels and agreeing on the minimum signal quality is childishly simple compared with the present definitions, confusing models and formulas.

Section 30

The predictive models can eliminate most households where the viewer would rather pay $60 per year for network signals, instead of investing in an antenna system that will more than pay for itself by often lasting twenty years. Predictive models should also eliminate any question from network affiliates if the predictive model clearly shows the home is unserved, as in mountain valleys, canyons, 100 miles from the broadcast tower, etc. It can't resolve the 'gray area' locations that may or may not be able to receive local stations. While signal levels are the most important factor in making a determination, severe ghosting or interference should also be determining factors. These are so varied that prediction is more a mandate for examining than simply making a map location judgment in disputed cases.

Section 31

This paragraph is correct. It just isn't right! A household should be required to pay the cost of performing a signal/picture quality check. It's part of the cost associated with living in the rural or scenic location, just as the extra costs of the 30, 40, 50 or more mile trip required for automobile commuting is paid by those, usually rural, people.

Broadcasters, of course, have little interest in making signal level checks. It is much easier to simply deny all residents in B contours. This is standard practice today.

Dish makers, already having invested billions of dollars and presently operating at multi-million dollar losses per quarter, would like to avoid the expense of having signal checks made. They realize that a percentage of possibly eligible homes in class B areas will simply not do the right thing and install a proper antenna. That is happening all across America! To the satellite manufacturer, or program provider, there must be a better way. That is to seek legislation to qualify all those who simply don't want to use an antenna.

Section 32

UHF signals - those we will primarily be using with High Definition Television - vary in signal intensity by several dB's, moment by moment, day or night, rain or shine. Very simply, raising the UHF minimum 2 or 3 dB is a practical solution to that not-so-difficult problem. As to the percentage of receivers receiving an acceptable picture more than 90% of the time, that percentage should be 100%.

Section 33

The commission conclusion that the predictive methodology for Grade B is insufficient, is correct.

Section 34

ETA suggests the commission discontinue use of Longley-Rice propagation models, or simply use them as aids in determining 'probable' qualified or unqualified households. The viewer should not be denied access to television programming simply because he is within a circled area that probably has an above minimum field intensity. The recourse for any household should be an actual signal strength/picture quality test.

A better prediction method that could aid in signal quality decisions is the USSB/CEMA mapping project currently being finalized for all major metro areas of the U.S.

Section 35

The USSB/CEMA mapping project is better. It is however, only a better "estimator" of how well television signals are received. The use of these estimators can give broadcasters and satellite programmers a quick "yes" or "no" answer for 90% of the households in Grade B contour areas and those in absolute white areas. The remaining households must have a signal level/picture quality determination performed by a competent technician. The number of households requiring the SL/PQ check should then be less than 1%.

Section 36

A huge step can be taken in educating the public that they can receive local television stations clearly with the proper equipment. Simply provide a standard signal level minimum reading, this is a reading that can be made by a practicing technician/antenna installer who is properly equipped with a standard all-channel antenna, standard length of RG-6 coax and takes measurements at a practical height (20-25 ft), thereby clearly demonstrating to viewers that they either do, or do not receive acceptable signals.

The process of clearly defining Grade A and Grade B will tell the public what 50% or more do not realize - that they are not just in a "bad signal area". They just need an antenna system

adequate for their location. Those people who are sold a satellite system and then are given a "free" antenna, regardless of their predicted location, are being misled. This adds to the current confusion. The public can't be expected to become antenna experts, even though many are quite aware of the components required for maximum area reception. Being provided with wrong or misleading technical information about television reception products by sales people who are desperate to clinch a dish sale and more than willing to sell a low-priced, inadequate antenna system and allow the customer to believe that it is the best, is wrong. This is detrimental to the local broadcasters and to the public. It is also detrimental to the dish owner who is virtually forced to view satellite programming due to inferior local network reception. The local television channel reception need not be inferior.

One might conclude that an educational campaign is needed to better inform the public regarding television reception. The next step might be deciding this is too much of a job. However there is an already in place affordable system for informing the public about adequate television reception. It is the broadcast community, itself. Rather than telling the public they aren't eligible for network signals via satellite, the entire broadcast community and satellite industry should do what it has neglected throughout its history: inform viewers about the requirements for adequate viewing of their signals. This may seem like a gigantic step towards solving the SHVA arguments, but the results will be millions of viewers with clearer network signals.

B3 Testing for Signal Intensity at Individual Households

Section 37

There are antenna technicians in every area of the country. Due to the depressed nature of the satellite and antenna installation business since the advent of the small DTH dish systems, most antenna workers do not have sufficient signal intensity measuring equipment. Virtually

all cable system technicians do have adequate test equipment. Virtually all those antenna technicians involved with small cable and/or with multiple dwelling unit signal distribution systems have excellent measurement equipment. There are sufficient well equipped antenna-cable-SMATV system firms to perform all the measurements required. The DISH Network has recently made available a package, including a new signal level meter, mast, tripod and cable for making these measurements. This package costs less than $500. The point here is that measuring the levels at any household is possible right now. Once antenna technicians can see how to measure the Grade B signals (easily made with a microvolt meter and an intelligent definition of the minimum signal levels), those under-equipped workers will purchase the measurement equipment. (This too can really be a plus for the entire television industry.) Field strength measurements can be done practically with common field equipment and should not require laboratory calibrated precision to within a fraction of a microvolt. So the job of measuring signals is affordable, and easy to do in the areas where measuring the signals is the only correct way to make the right decision.

As with any other rule or procedure, appeals need to be available to provide any party with second opinions in case of disputed or suspect findings.

Section 38

The procedure is too complicated although most antenna installers have made similar mobile tests that achieve the same end result. Today's antenna technician is usually familiar with walking a property with an antenna signal level meter to sniff out cable leakage and other sources of interference. While any cost is too much for some people, a signal level check for $100 or $200 may be less than a home owner pays for a water quality or basement Radon survey, termite or rodent inspection or any other type of vital information. Given the competitiveness of the satellite/antenna business, most areas will quickly find site surveys being advertised at below-cost prices. This will be done because some entrepreneurs will

consider that signal level checks often lead to requests for an antenna system or other profitable work.

Section 39

Obviously, the current "no rotor" philosophy that some people subscribe to should be changed. Rotors are as important in many areas as steering wheels are in automobiles. Because a household needs to reverse the antenna to get a signal 180 degrees from another should not be an excuse to pay $600 over ten years to receive the signal via satellite instead of installing the proper antenna system.

Thus, this is what is required to perform a signal level measurement:

a. U/V all band antenna (with verifiable gain characteristics per channel)
b. Signal level meter resulting in microvolt (not dBu or microvolts per meter) readings as determined by consensus
c. Two ten-foot telescoping mast sections at 20-25 feet above highest ground within fifty feet of home
d. Fifty feet of RG-6 coax cable connected to antenna wing nuts with 300/75 ohm balun
e. Antenna oriented for maximum signal on channels in question
f. Modification of decision if microvolt reading is above minimum may be made for ghosting, electrical arcing, co- or adjacent channel objectionable interference

Section 40

Create a new method of testing. A method that is practical, affordable, and which uses commonly available equipment with understandable definitions. The definition of what qualifies as a conventional outdoor rooftop receiving antenna is a giant "elephant in the room" that is seriously in question and never defined.

We are discussing weak Grade B television signals. People in Grade B areas use combination all-channel antennas in most markets. Drive down any interstate highway to prove it. While cable head ends may use Yagi beam single-channel antennas in order to achieve the highest gain and narrowest beam width, the public rarely finds this practical. No major market today has just one or two television stations, most have multiple VHF and multiple UHF television stations. Thus, all-band antennas are practical.

The antenna makers advertise gain figures for each band and usually for each of the 12 VHF channels. The gain figures are not based against a one meter piece of metal, a one meter long half-wave dipole, or a square meter, but are based in microvolts on the much more realistic 1/2 wave dipole reference antennas, cut to a length proper for each channel. Typical gain figures for an inexpensive all-band antenna may be 4 dB to 12 dB over reference dipoles, depending on the channel. The DISH Network chose a Winegard PR7000 local area antenna as a suggested test antenna for SHVA signal measurements. It is practical in that its folded dimension is only 36 inches. Expanded, its longest element is 99 inches. The gain versus a longer channel 2 dipole reference antenna is low - only about 2 dB, while VHFhi and UHF channels have gains nearer 8dB. Gain figures for each brand and model of antenna are readily available, and verifiable. The gain figure for any channel, therefore, becomes the correction factor.

Any antenna can and most do have gains listed. Selecting an antenna to use as a SHVA test antenna need not be brand specific. A particular model from each manufacturer can easily be designated so as to simplify selection. With a simple gain chart for that all-band antenna a technician would quickly become familiar with his test antenna and quickly be able to subtract the gain figure on any channel from the resultant microvolt reading to ascertain the signal level at one or more locations near the household. A 1/2 wave dipole, constructed with telescoping aluminum rod elements is an alternative. The dipole - with channel lengths

and channel numbers etched on the antenna is a simple 1/2 wave dipole that would need no antenna correction factor.

Because the UHF band experiences greater loss of signal strength over distance (as compared with VHF bands), and because most HDTV broadcast stations will be allotted UHF spectrum, it may be that a separate type of UHF antenna should be considered as a test antenna for that band. Commonly called a "4-bay UHF screen" antenna, this compact (34" X 5" X 22") vertically mounted reflector is effectively 4 stacked bow-tie antennas with approximately three times the gain of simple half wave dipoles, over the entire UHF band. For purposes of signal level readings for the SHVA, any antenna gain must be subtracted from the resultant microvolt reading to ascertain the field strength that would be received on the reference dipole. The reason for suggesting this antenna and its 8-bay counterpart (which has even higher gain by 3.5 dB), is that they are the conventional UHF antennas for fringe rural areas, used with a pre-amplifier and usually a rotor.

As to the request for comments about "are different type antenna required for different parts of the country": the above 4- and 8-bay screen UHF antennas are utilized in fringe and deep fringe areas - in Class B and outwards. Mountain locations may not utilize them where reflections and ghost images are a problem. The long-boom corner reflector UHF antenna is better at rejecting multi-path signals due to its very narrow beam width, thus it is often the correct antenna choice.

Should MDU's use a different testing methodology? The only difference is that one can't re-aim the antenna serving multiple dwelling units(MDU's) if the antenna system is a master unit serving all occupant households. These antennas must be fixed in place, thus multiple antennas may be required. As to the SHVA minimums, no change in minimum signal levels need be made even though hi-rise apartment complexes should benefit from higher signal levels from roof mounted antenna arrays.

Some apartment dwellers, living in dwellings that have no master antenna system, are at a disadvantage when attempting to utilize an outdoor antenna for local reception. If a "conventional U/V combination all-channel antenna" cannot be mounted (no balcony, no yard, no attic or roof method) the MDU family can, if at a favorable distance and direction, utilize the flat stick or panel type of esthetically pleasing local antenna. These generally aren't choices in Grade B locations. To attempt to give MDU dwellers unconditional license to mount any style of outdoor antenna might be likened to giving them the unconditional license to install a swimming pool in or on their apartment. Subscribing to cable, or moving is often the most practical choice.

Does a conventional outdoor rooftop receiving antenna include a rotor? Yes, if stations are at different directions. Antennas are not omni-directional. Rotors are economical ($60-$75) and they do not require constant rotation. They do allow aligning the outdoor antenna precisely at the direction of the television station. Antennas are directional due to the laws of physics. To circumvent the intent of the SHVA because the homeowner prefers to not invest in a rotor, where needed, is not right.

Regarding outlying or near-fringe area locations, the "conventional rooftop antenna' requirements are greater. The SHVA does not specify that viewers should be able to receive all local network stations with the use of a $9.95 rabbit ears antenna. It should not limit the size, number of elements, number of bays, reflectors, directors, etc. commonly required for proper reception at distances or because of terrain problems. A "conventional outdoor antenna" is "an array of metal elements of correct length and design to receive electromagnetic signals for reproducing intelligence from television and other broadcasters. It may include the use an amplifier and/or a rotor."

Accuracy of tests: like any other measurement the SHVA tests are subject to cheating. Establish a clear microvolt maximum level for the tests above which distant network signals are not allowed, via satellite. This is the first step toward accurate measurement and

interpretation. Signal level meter accuracy can be demanded in the traditional manner, or penalties can be threatened for those who have not had a calibration check in the past year, or who knowingly make false measurements and false representations. The picture quality test is subject to the whim of viewers. What is a "good" picture to some, is "unacceptable" to others. Perhaps some acceptable versus unacceptable examples of television pictures can more closely present a "go - no go" determination as to objectionable ghosts or interference or snow.

As with any law - special variances should be allowed and special problems considered. The 30 foot measurement height may best be reduced to where a technician can, by himself, make the test. While unwieldy, this can be done by one tech using 2 ten-foot telescoping mast sections with a small U/V antenna and fifty feet of coax cable. Reducing the thirty foot height to twenty feet allows this, either hand holding the antenna, or mounting it on a common three or five foot tri-pod antenna mast mount. Thirty feet requires more than one person and a telescoping push-up mast, guy wires to stabilize, or a special truck boom and safety considerations above that of a twenty foot setup.

Obviously, if a house has multiple stories, is side hill, is backed up to sheer mountainside and so forth, the twenty to thirty foot measurement tends to mean less. In B contour areas the antenna needs to be above the roof peak. Where the antenna is finally mounted for actual service to the home may be an improvement over the test measurement location. We like the description "not less the twenty feet and not more than thirty feet for antenna test height".

The test equipment utilized should be a signal level meter that produces microvolt analog or digital signal voltage readings. Zero dBmV represents 1,000 microvolt analog or digital signal microvolts RMS and all other television signal levels can be compared with that level.

Variations in signal levels over the course of a day may not be a problem worthy of consideration. Seasonal changes are primarily signal diffusion in the UHF range due to moisture in tree foliage. Surely if a location is above the minimum B contour level - thus

being denied network via satellite - then later, signals decrease to below minimum - that household should be waived to be allowed the networks via satellite. Otherwise we are "picking the specks out of the pepper".

C. Other Issues

Section 41

The lack of an established practical methodology for Grade B measurements has caused the SHVA to not function at all. The "loser pays" mechanism is a method of deterring actual measurements when what is needed is more measurements. If a homeowner claims he is unserved, he should have the right to request an independent measurement, complete with official standard forms paperwork. The homeowner should be allowed to pay this initial cost. Then, if either the network station or the satellite carrier disputes the results, a second opinion should be contracted for and the loser pays. Allowing the homeowner to instigate the measurements when he may clearly be in a "served" location, with no responsibility for costs is an invitation to chaos.

Section 42.

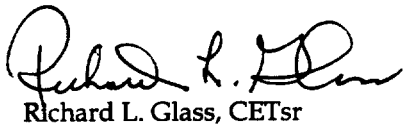
Item 42 appears to be answered in the #41 comment in part. The presumptive rule will solve many possible disputes. A zip code household that isn't within 200 miles of any CBS affiliate should not need to spend a great deal of time determining eligibility for satellite delivered CBS network affiliate signals. Of course the "loser pays" mechanism should be in effect to discourage unreasonable or arbitrary demands by unqualified homeowners, dish programmers, or broadcasters.

Section 43

Currently, local into local satellite programming is much more expensive for the homeowner than utilizing a proper rooftop antenna. However the LNL scheme does not diminish the value the local broadcaster provides to each community. It does cause devastating damage to any local channel that is not also available via satellite to the local community. If one or more broadcast signals of network affiliates are beamed via satellite to dish owners opting to pay the higher costs, then the "must carry" rule should apply where a dish subscriber can access, in the same programming package, each and every local television broadcast station in his area.

Since HDTV should require double bandwidth, it appears to aggravate the available spectrum problem, causing satellite providers to be able to in the future offer fewer local channels per metro area, rather than more (or preferably all) local broadcast television stations.

Respectfully submitted



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